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Application Number

60/120500

Filed

Feb 18, 1999

Paper No. _____

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United States Patent Application Publication No. 606 24420, page, _____ line _____.

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(12) United States Patent

Chai et al.

(10) Patent No.: US 6,624,420 B1
(45) Date of Patent: Sep. 23, 2003

(54) LUTETIUM YTTRIUM ORTHOSILICATE SINGLE CRYSTAL SCINTILLATOR DETECTOR

(75) Inventors: Bruce H. T. Chai, Oviedo, FL (US);
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(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

(21) Appl. No.: 09/506,160

(22) Filed: Feb. 17, 2000

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(60) Provisional application No. 60/120,500, filed on Feb. 18,
1999.

(51) Int. Cl.⁷ G01T 1/202; C09K 11/08

(52) U.S. Cl. 250/361 R; 252/301.4 F

(58) Field of Search 250/361 R; 252/301.4 F

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(57) ABSTRACT

A single crystal having the general composition, Ce_{2x}(Lu_{1-y}Y_y)_{2(1-x-y)}SiO₅, where x=approximately 0.00001 to approxi-
mately 0.05 and y=approximately 0.0001 to approximately
0.9999; preferably where x ranges from approximately
0.0001 to approximately 0.001 and y ranges from approxi-
mately 0.3 to approximately 0.8. The crystal is useful as a
scintillation detector responsive to gamma ray or similar
high energy radiation. The crystal as scintillation detector
has wide application for the use in the fields of physics,
chemistry, medicine, geology and cosmology because of its
enhanced scintillation response to gamma rays, x-rays, cos-
mic rays and similar high energy particle radiation.

17 Claims, 5 Drawing Sheets

SCINTILLATING DETECTORS

Ce³⁺:LYSO
CRYSTAL

PHOTOMULTIPLIER
OR OTHER PHOTO-DETECTOR